FOCUSED SITE INSPECTION PRIORITIZATION
SAMPLING WORKPLAN
MURRELL LANDFILL SITE
DECATUR, MACON COUNTY, ILLINOIS
U.S. EPA ID NO.: ILD980901540
TECHNICAL DIRECTION DOCUMENT NO.: T05-9503-212

July 24, 1995

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
SITE ASSESSMENT SECTION
77 West Jackson Boulevard
Chicago, Illinois 60604

Prepared by: _____
Alix J. Rauschman, TAT Project Manager
Ecology and Environment, Inc.

Submitted by: _____
Steven J. Share, TAT FSIP Program Leader
Ecology and Environment, Inc.

Approved by: _____
Sonia Vega, Work Assignment Manager
U.S. EPA Region 5

TASK SUMMARY

Proposed Date of Task: August 1, 1995

Contacts:

U.S. EPA: Sonia Vega (312) 886-7191

IEPA: Thomas Crause (217) 524-1658

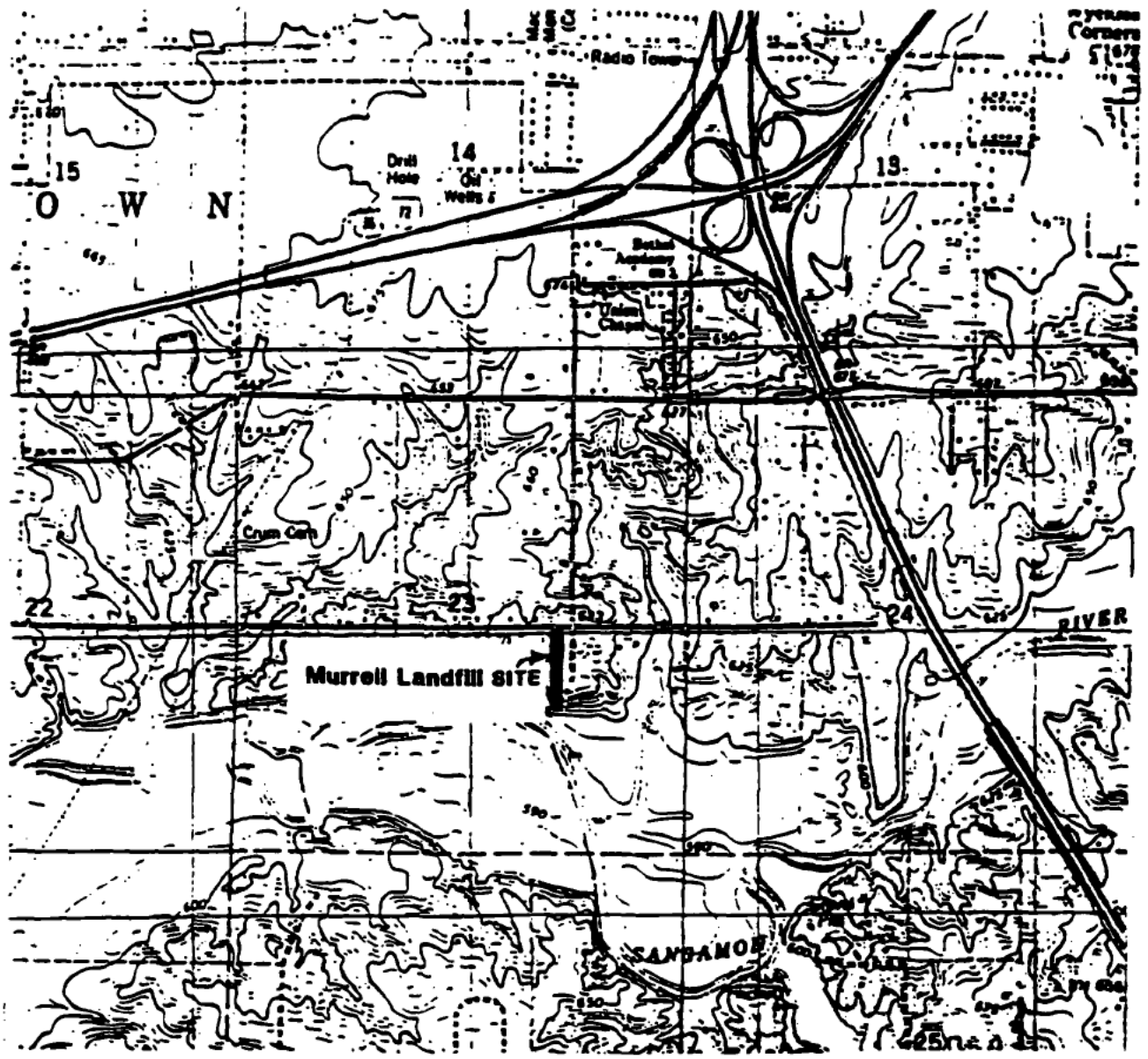
Introduction:

The Murrell Landfill, currently owned by Mr. Reuben Murrell, is a redundant 6-acre facility that has not been active as a landfill since 1972. The Murrell Landfill site currently serves as a storage and maintenance area for Rueben Murrell's son. Ecology and Environment, Inc. (E & E) Field Investigation Team (FIT) conducted a Screening Site Inspection (SSI) of the Murrell Landfill in 1990 and identified soil contamination.

The surface water pathway is being evaluated because on-site soils and sediments contained arsenic and other contaminants. Arsenic is the contaminant of concern because it was detected in sediment sample S1 collected from the on-site intermittent stream that drains into the Sangamon River. These contaminants have the potential to migrate to the Sangamon River, and wetlands, located downgradient from the site. The Focused Site Inspection Prioritization (FSIP) sampling will focus on assessing the potential for a release of arsenic and other on-site contaminants from the intermittent stream to the wetlands downstream of the site to occur.

Site Description:

The Murrell Landfill is 6 acres in size and has been inactive since 1972. See Figure 1 for the site location. The site is surrounded by residences to the east and west, Hill Road to the north, and the Sangamon River to the south. According to the E & E FIT SSI report, an intermittent stream flows from the Murrell Landfill site to the Sangamon River located south of the site. See Figure 2 for site features. The intermittent stream is approximately 150 yards long, and leachate flows are assumed to have migrated via the stream to the Sangamon River. Leachate may have migrated to wetlands located south of, and downstream of the site for many miles. It unknown how many days or months the intermittent stream serves as a potential surface water source for contaminants to migrate to the Sangamon River during the



Quadrangle Location

ecology and environment, inc.
Technical Assistance Team
Region V

TITLE	Site Location Map	FIGURE # 1
SITE	Murrell Landfill	TDD T05-9503-212
CITY Decatur	STATE Illinois	SCALE 1:24,000
SOURCE Ecology and Environment, Inc.		DATE 1972 REVISED 1995

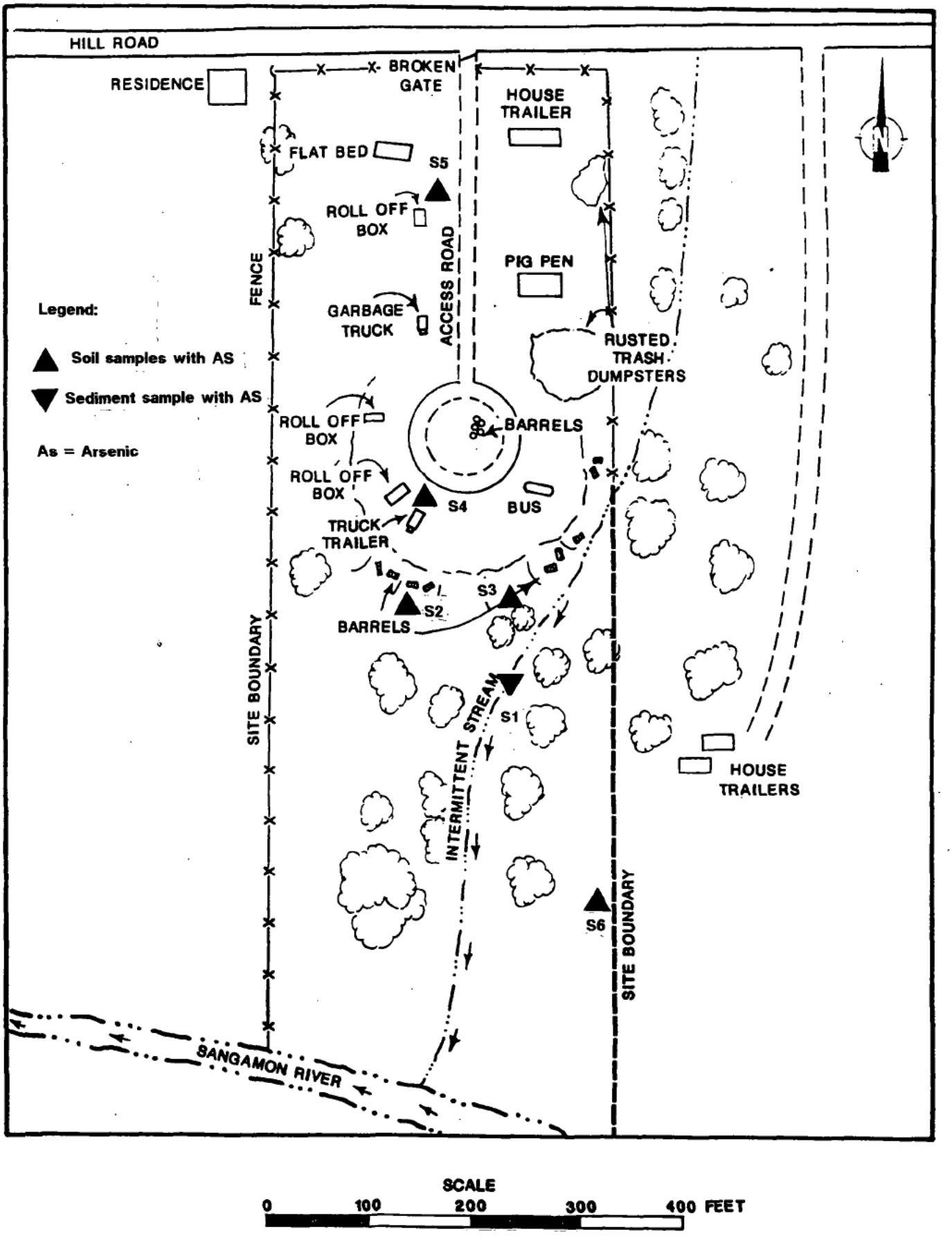


Figure 2: Site Features Map

course of the year. There is no containment device on the site that prevents contaminants from entering the Sangamon River.

On February 21, 1990, E & E FIT collected six on-site soil/sediment samples and four off-site residential well samples at locations selected during the reconnaissance inspection of the Murrell Landfill site. Halogenated hydrocarbons, phthalates, pesticides, heavy metals, metals, common laboratory artifacts, and common soil constituents were detected in on-site soils. Arsenic, cyanide, and other common soil constituents were encountered at concentrations that exceeded three times the background sample concentration. Arsenic was detected in all on-site soil samples. Volatile organic compounds (VOCs) such as 1,2-dichloroethene, trichloroethene, tetrachloroethene, and toluene; semivolatile organic phthalates, and pesticides such as 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and alpha- and gamma-chlordane were detected in on-site soils, but not in the background sample. The sediment sample, S1, contained VOCs, arsenic at 6.1 milligrams per kilogram (mg/kg), and other heavy metals at low concentrations.

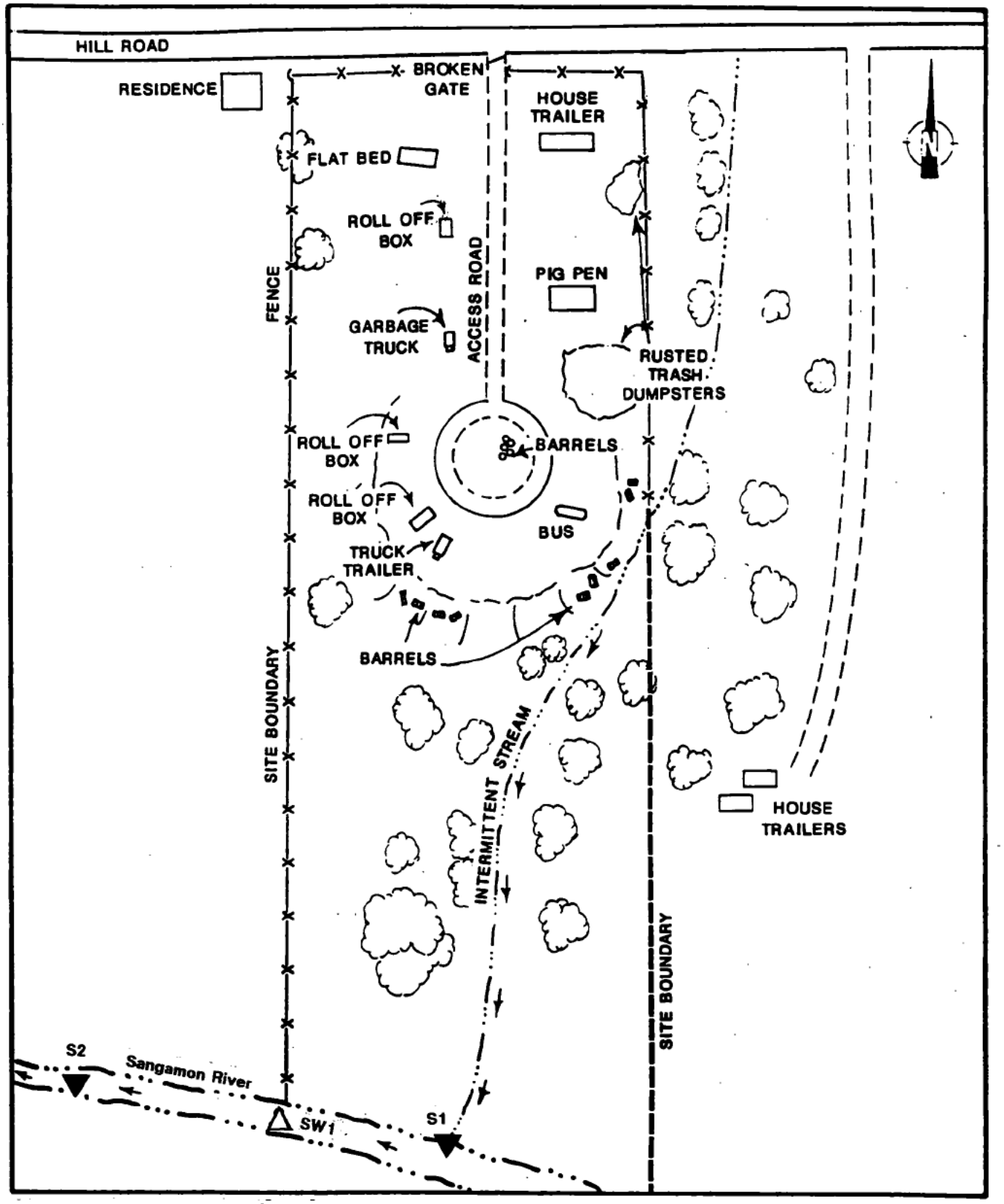
Potential Targets:

The Sangamon River is used for recreational fishing in areas downgradient from the site. The intermittent stream, occasionally dry, does not support fish. Arsenic was detected in a sediment sample collected at a location west of the intermittent stream at a concentration of 6.1 mg/kg. Since arsenic was not encountered in the background sample, arsenic concentrations could be attributable to on-site contamination.

Analytical data suggest that arsenic, polynuclear aromatic hydrocarbons (PAHs), and other contaminants were encountered in the on-site soil and sediment samples. No surface water samples were collected at the intermittent stream during either the E & E FIT SSIs.

Sampling Strategy and Procedures:

The Macon County Landfill #2 (MCL #2) and the Waste Hauling, Inc. sites are located upstream and downstream of the Murrell Landfill site, respectively. Due to their proximity to the Murrell Landfill site along the Sangamon River, samples will be collected at these sites in conjunction with the samples collected at the Murrell Landfill site. Sampling will be conducted at the Murrell Landfill site to determine if a release of arsenic or other contaminants to the Sangamon River and adjacent wetlands has occurred. Samples collected at the other sites will be conducted to determine the presence of different contaminants. See



Note: Sample locations may change.

SCALE

0 100 200 300 400 FEET

Figure 3: Sample Collection Locations

Figure 3 for proposed sample locations. A total of two sediment samples and a total of one surface water sample from three discrete locations will be collected (see Table 1 for proposed sample strategy). One sediment sample will be collected at the probable point of entry (PPE) where the intermittent stream drains into to the Sangamon River. One sediment sample will be collected downgradient at one of the adjacent wetlands. One surface water sample will be collected at a maximum of 100 yards downstream of the PPE depending on surface water conditions. Sample duplicates will be collected from the Waste Hauling, Inc. site. A sample designated as matrix spike/matrix sample duplicate (MS/MSD) will be collected upgradient of the Macon County Landfill.

These samples will be analyzed for the full Target Analyte List and Target Compound List (TAL/TCL) chemicals under the Contract Laboratory Program (CLP). A trip blank will be prepared and analyzed for volatile organic compounds (VOCs) under the CLP. E & E Standard Operating Procedures for sediment sampling, surface water sampling, and other applicable activities will be followed. Contract Laboratory Program guidance will be strictly followed by the sample custodian and the field sampling team.

Personnel:

Name:	Responsibility:
Alix Rauschman	Project Manager
Linda Knorz	Site Safety Officer/Sample Manager

Safety Considerations:

A copy of the E & E site-specific safety plan (SSP) is included in Attachment A. The contaminants of concern, chemical and physical hazards, levels of protection, emergency procedures, and other safety considerations are discussed in the SSP.

Table 1

PROPOSED SAMPLING STRATEGY
MURRELL LANDFILL SITE
DECATUR, MACON COUNTY, ILLINOIS
U.S. EPA ID NO.: ILD980901540

Sample Designation	Matrix	Analysis	Sample Function/ QA/QC Requirements	Sample Location
S1	Sediment	TAL/TCL	At PPE	Sangamon River
S2	Sediment	TAL/TCL	Downgradient at wetland	Sangamon River
SW1	Surface Water	TAL/TCL	Downgradient of PPE	Sangamon River
W1	Aqueous	VOCs	Trip Blank	--

Key: MS/MSD: Matrix Spike/Matrix Spike Duplicate
TAL/TCL: Target Analyte List/Target Compound List
QA/QC: Quality Assurance/Quality Control
VOCs: Volatile Organic Compounds

Source: E & E 1995

ATTACHMENT A

SITE SPECIFIC SAFETY PLAN

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ecology and environment, inc.

SITE SAFETY PLAN

A. GENERAL INFORMATION

Project Title: Focused Site Inspection Prioritization	Project No.: ZT3051
	TDD/Pan No.: T05-9503-212/EIL0492VAA
Project Manager: Steve Skare	Project Dir.: Thomas Kouris
Location(s): Murrell Landfill, Hill Road, Rural Route #8, Decatur, Illinois	
Prepared by: Qing Jiang	Date Prepared: 07/25/95
Approved by: Dean Tiebout	Date Approved: 7/27/95
Site Safety Officer Review:	Date Reviewed:

Scope/Objective of Work: Collection of 2 sediment and 1 surface water samples from the Sangamon River adjacent to the site.

Proposed Date of Field Activities: August 1, 1995

Background Information: Complete: [X] Preliminary (no analytical data available) []

Documentation/Summary: S I Report

Overall Chemical Hazard:	Serious	[ ]	Moderate	[ ]
	Low	[X]	Unknown	[ ]
Overall Physical Hazard:	Serious	[ ]	Moderate	[ ]
	Low	[X]	Unknown	[ ]

B. SITE/WASTE CHARACTERISTICS

Waste Type(s):

Liquid [X]	Solid [X]	Sludge [X]	Gas/Vapor [ ]

Characteristic(s):

Flammable/Ignitable	[X]	Volatile	[X]	Corrosive	[ ]	Acutely Toxic	[ ]
Explosive	[ ]	Reactive	[ ]	Carcinogen	[X]	Radioactive[a]	[ ]

Other: Suspect carcinogen

Physical Hazards:

Overhead	[ ]	Confined Space	[]	Below Grade	[X]	Trip/Fall	[X]
Puncture	[X]	Burn	[ ]	Cut	[X]	Splash	[X]
Noise	[X]	Other: debris					

[a] Requires completion of additional form and special approval from the Corporate Health/Safety group. Contact RSC or HQ.

Site History/Description and Unusual Features (see Sampling Plan for detailed description):
The site has been operated as a waste storage since 1962. From 1952 to 1962, the site was a waste dump. TCL and TAL compounds were detected in on-site soil and sediment samples. See next page.

Locations of Chemicals/Wastes:
Drums, garbage containers, boxes. Chemical also present in surface water, groundwater, and leachate. .

Estimated Volume of Chemicals/Wastes:
Unknown

Site Currently in Operation Yes [ ] No [X]

C. HAZARD EVALUATION

List Hazards by Task (i.e., drum sampling, drilling, etc.) and number them. (Task numbers are cross-referenced in section D).

Physical Hazard Evaluation:
1. Site reconnaiisance: Trip/fall, below grade, hoise, heat stress. 2.Site sampling: Trip/fall, heat stress, cut, puncture, below grade, noise, and splash.

Chemical Hazard Evaluation:

Compound	PEL/TWA	Route of Exposure	Acute Symptoms	Odor Threshold	Odor Description
DDD	1 ppb	IH,ING, S, E	V, Eye irritation	NA	--
DDT	1 ppb	IH, ING, S, E	DZ, V, IR1	NA	--
TCE	50 ppm 100 ppm	IH, ING, S, E	IR1, N, DM	50 ppm	sweet
1,2-dichloroethene	1 ppm	IH, ING, E, S	H, WK, pain, IR1, bluish, N, V	5 ppm	sweet
Tetrachlorethene	50 ppm	INH, E, S, ING	IR1, IR2, V , N, DZ, H	5 ppm	--
Toluene	100 ppm	INH, ING, E, S	IR1, S, fatigue, WK, C, DZ, LOC	1.6 ppm	aromatic
Arsenic	100 ug/m3	INH, E, ING	Fatigue, V, WK, IR2, CNS	--	--

Note: Complete and attach a Hazard Evaluation Sheet for major known contaminant.

KEY: **Route of Exposure:**
IH = Inhalation **IN** = Inhalation **S** = Skin **E** = Eye **S** = Skin notation

Acute Symptons:
CNS = Central Nervous System efffects
DZ = Dizziness
DM = Dermatitis
E = Eyes
LOC = Loss of consciousness
1R1 = Irritation of eyes/mouth/throat
1R2 = Irritation of respiratory tract
N = Nausea
V = Vomiting
H = Headache
WK = Weakness

Site History Continued.

The Murrell Landfill site is bordered on the east by a wooded area and a residence, on the west by a residence, on the south by the Sangamon River, and on the north by Hill Road. The Murrell Landfill site is located approximately 3.5 miles southwest of Decatur. The landfill when in operation, accepted drums of petroleum oils, domestic garbage, scrap metal, concrete, and scrapped vehicles.

According to the E & E FIT SSI report, an intermittent stream flows from the Murrell Landfill site to the Sangamon River located south of the site. See site features map. The intermittent stream is approximately 150 yards long, and leachate flows are assumed to have migrated via the stream to the Sangamon River. Leachate may have migrated to wetlands located south of, and downstream of the site for many miles. It unknown how many days or months the intermittent stream serves as a potential surface water source for contaminants to migrate to the Sangamon River during the course of the year. There is no containment device on the site that prevents contaminants from entering the Sangamon River.

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Key: MS/MSD: Matrix Spike/Matrix Spike Duplicate
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QA/QC: Quality Assurance/Quality Control
VOCs: Volatile Organic Compounds

Source: E & E 1995

D. SITE SAFETY WORK PLAN

Site Control: Attach map, use back of this page, or sketch of site showing hot zone, contamination reduction zone, etc.

Perimeter identified?	[x]	Site secured?	[X]
Work areas designated?	[X]	Zone(s) of contamination identified?	[ ]

Personal protection (TLD badges required for all field personnel):

Anticipated level of protection (cross-reference task numbers to Section C):

Task Number	Description	A	B	C	D
Task 1	Site Recon			(X)	X
Task 2	Surface water and sediment sampling			(X)	X

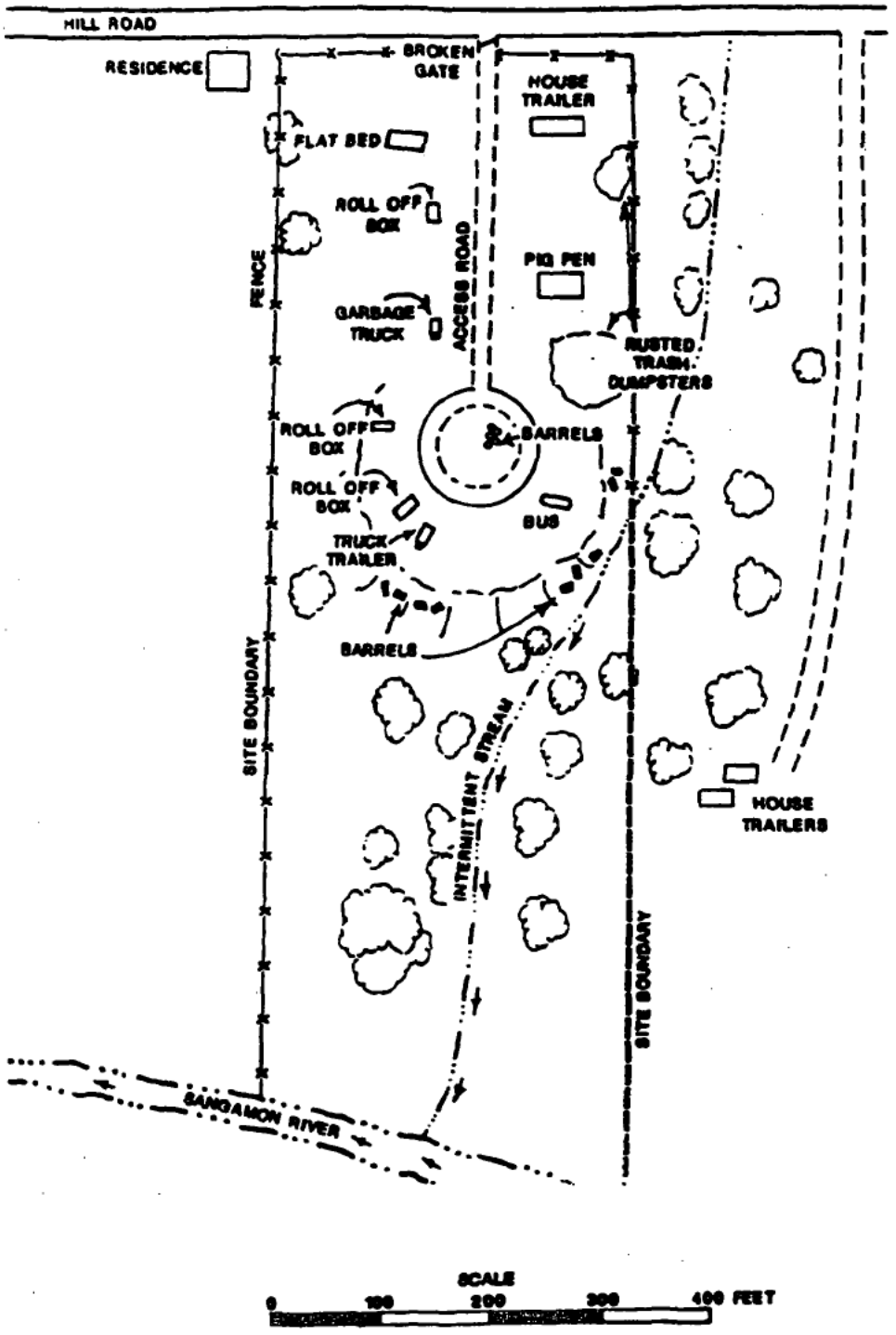
Modifications: Upgrade level of repiratory protection to Level C if air monitoring results indicate that action levels are exceeded in worker breathing zones, or in windy, dusty conditions in areas with known or suspected surface soil contamination.

Action levels for evacuation of work zone pending reassessment of conditions:

- Level D: 0_2 <19.5% or >25%, explosive atmosphere >10% LEL, organic vapors above background levels, particulates >2.5 mg/m^3, other NA.
- Level C: 0_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors (in breathing zone) >5 ppm, particulates >NA mg/m^3, other NA.
- Level B: 0_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors (in breathing zone) >500 ppm, particulates >NA mg/m^3, other NA.
- Level A: 0_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors >500 ppm, particulates >NA mg/m^3, other NA.

Air Monitoring (daily calibration unless otherwise noted):

Contaminant of Interest	Type of Sample (area, personal)	Monitoring Equipment	Frequency of Sampling
Volatile Organics	Area	HNu/OVA	Continuous during site walkthrough and sampling



Quadrangle Location

ecology and environment, inc.
Technical Assistance Team
Region V

TITLE	Site Features Map	FIGURE # 2-2
SITE	Murrell Landfill	TDD# T05-9501-212
CITY	Decatur STATE Illinois	SCALE 1:24,000
SOURCE	B & V Waste Science and Technology Corp.	DATE 1993
		REVISED ----

Decontamination solutions and procedures for equipment, sampling gear, etc:
Non-dedicated sampling equipment will be washed with an Alconox/water solution and tripe-rinsed with distilled water. Air monitoring equipment will be cleaned to the extent practicable using a damp cloth or as per manufacturer recommendation

Personnel decontamination protocol:
Personnel shall wash outer gloves and booties with an Alconox/water solution and rinse with distilled water prior to glove/boot removal. Gross contamination on coveralls will be removed and the coveralls will be placed in bags for disposal. In case of accidental contact with contaminants (e.g. splash), personnel should wash affected area immediately with soap and water. All personnel should take a hygienic shower at the end of the work day.

Decontamination solution monitoring procedures, or procedures, if applicable: Not applicable

Special site equipment, facilities, or procedures (sanitary facilities and lighting must meet 29 CFR 1910.120):
Smoking, eating and chewing tobacco will not be permitted in areas of known or suspected contamination. The buddy system will be maintained at all times. E&E personnel will follow the site safety requirements specified by the site owner/representative at a minimum.

Site entry procedures and special considerations:
Permission will be obtained from the site owner prior to site entry. Stay upwind of contamination, if possible. E&E personnel shall be escorted by a site representative, if required by site owners.

Work limitations (time of day, weather conditions, etc.) and heat/cold stress requirements:
Work is limited to daylight hours only, and workers are to be monitored for heat/cold stress. Cease operations in electrical storms.

General spill control, if applicable: Not applicable.

Investigation-derived material disposal (i.e., expendables, decon waste, cuttings):
IDM will be double-bagged and left on-site in secure area with prior permission of site owner until proper disposal classification is determined.

Sample handling procedures including protective wear:
Sample bottles will be decontaminated by washing (not submerging) the bottles in an Alconox/water solution and rinsing with distilled water. Latex gloves, at a minimum, will be worn when handling samples. Respiratory protection will be used based on professional judgement.

Team Member[a]	Responsibility
Alix Rauschman	Team Leader
Linda Knorz	Site Safety Officer

a All entries into exclusion zone require Buddy System use. All E&E field staff must have participated in medical monitoring program and completed applicable training per 29 CFR 1910.120. Respiratory protection program must meet requirements of 29 CFR 1910.134, and ANSI Z88.2 (1980).

E. EMERGENCY INFORMATION

(Use supplemental sheets, if necessary)

LOCAL RESOURCES

(Obtain a local telephone book from your hotel, if possible)

Ambulance: 911

Hospital emergency room: (217) 429-2966

Poison Control Center: St. Johns Hospital, Springfield, IL, (217) 753-3330 or 1 (800) - 252 - 2022

Police (include local, county sheriff, state): 911

Fire Department: 911

Airport: NA

Agency contact (EPA, state, local USCG, etc.): Sonia Vega (USEPA), (312) 886-7191

Local laboratory: NA

UPS/Federal Express: 1 (800) 238-5355

Client/EPA contact: NA

Site contact: Reuben Murrell (217) 963-2235

SITE RESOURCES

Site emergency evacuation alarm method: TBD

Water supply source: Water will be supplied by E&E.

Telephone location, number: TBD

Cellular phone, if available: NA

Radio: NA

Other:

EMERGENCY CONTACTS

1. Dr. Raymond Harbison (University of Florida) Alachua, Florida	(501) 221-0465 or (904) 462-3277, 3281 (501) 870-8263 (24 hours)
2. Ecology and Environment, Inc. Safety Director Paul Jonmaire	(716) 684-8060 (office) (716) 655-1260 (home)
3. Regional Office Contact Dean Tiebout (Regional Safety Coordinator)	(312) 338-4423 (home) (312) 663-9415 (office)
4. FITOM, TATOM, or Office Manager Thomas Kouris (Region V TAT leader)	(800) SKY-PAGE P/N:5221276 + Number calling from. Press # twice after entering number

MEDTOX HOTLINE

1. Twenty-four hour answering service: (501) 370-8263

   What to report:

   - State: "This is an emergency."
   - Your name, region, and site.
   - Telephone number to reach you.
   - Your location.
   - Name of person injured or exposed.
   - Nature of emergency.
   - Action taken.

2. A toxicologist, (Drs. Raymond Harbison or associate) will contact you. Repeat the information given to the answering service.
3. If a toxicologist does not return your call with 15 minutes, call the following persons in order until contact in made:

   a. 24-hour hotline - (716) 684-8940
   b. Corporate Safety Director - Paul Jonmaire - (716) 655-1260 (home)
   c. Assistant Corporate Safety Officer - Steven Sherman - (716) 688-0084 (home)

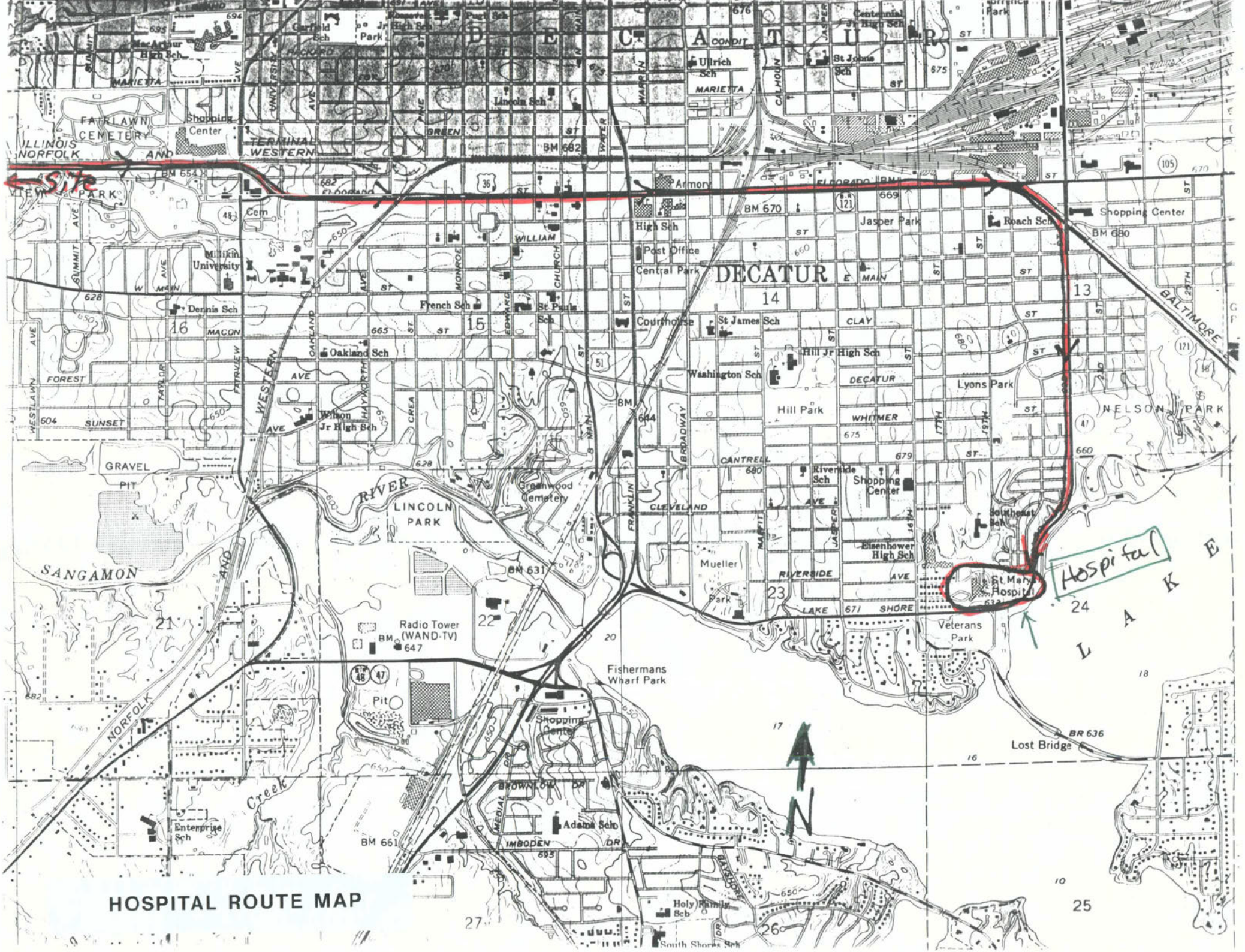
EMERGENCY ROUTES

(NOTE: Field Team must know route(s) prior to start or work)

Directions to hospital (include map):

Rt. 36 East to 22nd ST. south to St. Mary Hospital located at 1800 E. Lake Shore Drive, Decatur.
See the attached map.

Emergency egress routes to get off site: Go out from front gate



HOSPITAL ROUTE MAP

F. EQUIPMENT CHECKLIST			
PROTECTIVE GEAR			
Level A	**No.**	**Level B**	**No.**
SCBA		SCBA	
SPARE AIR TANKS		SPARE AIR TANKS	
ENCAPSULATING SUIT (Type _____)		PROTECTIVE COVERALL (Type _____)	
SURGICAL GLOVES		RAIN SUIT	
NEOPRENE SAFETY BOOTS		BUTYL APRON	
BOOTIES		SURGICAL GLOVES	
GLOVES (Type _____)		GLOVES (Type _____)	
OUTER WORK GLOVES		OUTER WORK GLOVES	
HARD HAT		NEOPRENE SAFETY BOOTS	
CASCADE SYSTEM		BOOTIES	
5-MINUTE ESCAPE COOLING VEST		HARD HAT WITH FACE SHIELD	
		CASCADE SYSTEM	
		MANIFOLD SYSTEM	
Level C		**Level D**	
ULTRA-TWIN RESPIRATOR		ULTRA-TWIN RESPIRATOR (Available)	
POWER AIR-PURIFYING RESPIRATOR		CARTRIDGES (Type GMC-H)	
CARTRIDGES (Type GMC-H)		5-MINUTE ESCAPE MASK (Available)	
5-MINUTE ESCAPE MASK		PROTECTIVE COVERALL (Type Tyvek)	
PROTECTIVE COVERALL (Type _____)		RAIN SUIT	
RAIN SUIT		NEOPRENE SAFETY BOOTS	
BUTYL APRON			
SURGICAL GLOVES		NITRILE OUTER GLOVES	
GLOVES (Type _____)		HARD HAT WITH FACE SHIELD	
OUTER WORK GLOVES		SAFETY GLASSES	
NEOPRENE SAFETY BOOTS		GLOVES (Type Nitrile)	
HARD HAT WITH FACE SHIELD		INNER GLOVES - LATEX	
BOOTIES			
HARD HAT			

INSTRUMENTATION	No.	DECON EQUIPMENT	No.
OVA		WASH TUBS	
THERMAL DESORBER		BUCKETS	
O_2/EXPLOSIMETER W/CAL. KIT		SCRUB BRUSHES	
PHOTOVAC TIP		PRESSURIZED SPRAYER	
Hnu (Probe _____)		DETERGENT (Type _____)	
MAGNETOMETER		SOLVENT (HEXANE)	
PIPE LOCATOR		PLASTIC SHEETING	
WEATHER STATION		TARPS AND POLES	
DRAEGER PUMP, TUBES _____		TRASH BAGS	
BRUNTON COMPASS		TRASH CANS	
MONITOX CYANIDE		MASKING TAPE	
HEAT STRESS MONITOR		DUCT TAPE	
NOISE EQUIPMENT _____		PAPER TOWELS	
PERSONAL SAMPLING PUMPS		FACE MASK	
MINI RAM (Particulates)		FACE MASK SANITIZER	
PID		FOLDING CHAIRS	
		STEP LADDERS	
RADIATION EQUIPMENT		DISTILLED WATER	
DOCUMENTATION FORMS			
PORTABLE RATEMETER		**SAMPLING EQUIPMENT**	
SCALER/RATEMETER		8-OZ. BOTTLES	
NaI Probe		HALF-GALLON BOTTLES	
ZnS Probe		VOA BOTTLES	
GM Pancake Probe		STRING	
GM Side Window Probe		HAND BAILERS	
MICRO R METER		THIEVING RODS WITH BULBS	
ION CHAMBER		SPOONS	
ALERT DOSIMETER		KNIVES	

POCKET DOSIMETER		FILTER PAPER	
		PERSONAL SAMPLING PUMP SUPPLIES	
FIRST AID EQUIPMENT		4-OZ. JARS	
FIRST AID KIT		GAUZE	
OXYGEN ADMINISTRATOR		SQUEEZE BOTTLE	
STRETCHER			
PORTABLE EYE WASH			
BLOOD PRESSURE MONITOR			
FIRE EXTINGUISHER			

VAN EQUIPMENT	No.	**MISCELLANEOUS (Cont.)**	No.
TOOL KIT		BINOCULARS	
HYDRAULIC JACK		MEGAPHONE	
LUG WRENCH			
TOW CHAIN			
VAN CHECK OUT			
Gas			
Oil			
Antifreeze			
Battery			
Windshield wash			
Tire pressure			
MISCELLANEOUS		**SHIPPING EQUIPMENT**	
PITCHER PUMP		COOLERS	
SURVEYOR'S TAPE		PAINT CANS WITH LIDS, 7 CLIPS EACH	
100 FIBERGLASS TAPE		VERMICULITE	
300 NYLON ROPE		SHIPPING LABELS	
NYLON STRING		DOT LABELS: "DANGER"	
SURVEYING FLAGS		"UP"	

FILM		"INSIDE CONTAINER COMPLIES ..."	
WHEEL BARROW		"HAZARD GROUP"	
BUNG WRENCH		STRAPPING TAPE	
SOIL AUGER		BOTTLE LABELS	
PICK		BAGGIES	
SHOVEL		CUSTODY SEALS	
CATALYTIC HEATER		CHAIN-OF-CUSTODY FORMS	
PROPANE GAS		FEDERAL EXPRESS FORMS	
BANNER TAPE		CLEAR PACKING TAPE	
SURVEYING METER STICK			
CHAINING PINS AND RING			
TABLES			
WEATHER RADIO			

ATTACHMENT 1
HAZARD EVALUATION SHEETS

ecology and environment, inc.

JOB NO HAZARD EVALUATION OF CHEMICALS PREPARATION/UPDATE DATE 5/8/90

CHEMICAL NAME: ARSENIC

CAS NUMBER: 7440-38-2 DOT NAME/ID NO.: ARSENIC, UN 1558 RQ:
SYNONYMS:

CHEMICAL AND PHYSICAL PROPERTIES:

CHEMICAL FORMULA: As MOLECULAR WEIGHT: 74.9 PHYSICAL STATE: BLACK SOLID SPG/D N/A SOLUBILITY (H20): INSOL
VAPOR PRESS: FREEZING POINT: N/A BOILING POINT: SUBLIM FLASH POINT: FLAMMABLE LIMITS: N/A
ODOR CHARACTERISTICS: ODORLESS
INCOMPATABILIITIES: HALOGENS, OXIDIZERS, ZINC, BROMINE, AZIDE, AIR

BIOLOGICAL PROPERTIES:

IDLH: 100 MG/M3 TLV-TWA: 0.2 MG/M3 PEL: 10 UG/M3 ODOR THRESHOLD:
HUMAN (LCLO): ORAL RAT/MOUSE (LC50): AQUATIC:
CARCINOGEN: YES TERATOGEN: MUTIGEN:
ROUTE OF EXPOSURE: [X] INHALATION [X] EYE CONTACT [ ] SKIN CONTACT [X] INGESTION

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

<100 UG/M3 USE APR; >UG/M3 USE SCBA; VITON, VINYL, NITRILE, NEOPRENE.

MONITORING RECOMMENDATIONS:

HEALTH HAZARDS: SYSTEMIC POISON REQUIRING SPECIFIC ANTIDOTE

ACUTE SYMPTOMS: ING-STOMACH DISTURBANCES, BURNING/DRY ORAL CAVATIES, VOMITING, SEVERE WEAKNESS, PERFORATION OF NASAL SEPTUM, IRRITATION OF RESPIRATORY TRACT, POSSIBLE SKIN IRRITATION

CHRONIC SYMPTOMS: IHL-INDUSTRIAL CHRONIC POISIONING, FATIGUE, WEAKNESS, LOSS OF APPETITE, NAUSEAU, DIARRHEA, HORSENESS, UPPER RESP MUCOSA IRRITATION, ADVANCED STAGES SEE NERVE PROBLEMS IN EXTREMITIES, LIVER DAMAGE, LUNG CANCER, SKIN CANCER.

FIRST AID

INHALATION: REMOVE TO FRESH AIR; GIVE ARTIFICIAL RESPIRATION IF NEEDED

EYE CONTACT: FLUSH/RINSE WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES

SKIN CONTACT: REMOVE CONTAMINATED CLOTHING; WASH WITH SOAP AND WATER

INGESTION: GET MEDICAL ATTENTION IMMEDIATELY

DISPOSAL/WASTE TREATMENT:

REFERENCES CONSULTED: [ ] VERSCHUERAN [ ] MERCK INDEX [ ] HAZARDLINE [X] ACGIH [ ] TOXIC & HAZARDOUS SAFETY MANUAL [ ] CHRIS [ ] SAX
[X] NIOSH/OSHA POCKET GUIDE
[ ] OTHER: SAX, ALDRICH

ecology and environment, inc.

JOB NO HAZARD EVALUATION OF CHEMICALS PREPARATION/UPDATE DATE 6-09-93

CHEMICAL NAME: TOLUENE

CAS NUMBER: 108-88-3 DOT NAME/ID NO.: RQ:

SYNONYMS: PHENYL METHANE, METHYL BENZENE

CHEMICAL AND PHYSICAL PROPERTIES:

CHEMICAL FORMULA: C6H5CH3 MOLECULAR WEIGHT: 92 PHYSICAL STATE: LIQUID SPG/D 0.867 SOLUBILITY (H20): SLIGHTLY

VAPOR PRESS: 22 MM FREEZING POINT: -139 F BOILING POINT: 231 F FLASH POINT: 40 F FLAMMABLE LIMITS: 1.27-7%

ODOR CHARACTERISTICS:

INCOMPATABILIITIES: STRONG OXIDIZERS, NITRIC ACID, PEROXIDES

BIOLOGICAL PROPERTIES:

IDLH: 2000 PPM TLV-TWA: 50 PPM PEL: 100 PPM ODOR THRESHOLD: 0.17 PPM

HUMAN (LCLO): TCLO 200 PPM RAT/MOUSE (LC50): LCLO 400 AQUATIC: TLM 96: 100-10 PPM

CARCINOGEN: EXPER TERATOGEN: EXP MUTIGEN: EXPER

ROUTE OF EXPOSURE: [X] INHALATION [X] EYE CONTACT [X] SKIN CONTACT [X] INGESTION

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

1000 PPM-APR W/CHEMICAL CARTRIDGE;2000 PPM-SCBA, EXCEL-VITON, GOOD-POLYURETHANE, NEOPRENE/STYRENE;POOR-NEOPENE, BUTYL

MONITORING RECOMMENDATIONS:

HEALTH HAZARDS: MAY CAUSE IRRITATION OF EYES, RESPIRATORY TRACT AND SKIN. MAY ALSO CAUSE FATIGUE, WEAKNESS, CONFUSION, HEADACHE, DIZZINESS AND DROWSINESS. EXPOSURE TO HIGH CONCENTRATIONS CAN CAUSE UNCONSCIOUSNESS AND DEATH. INHALATION MAY CAUSE DIFFICULTY SEEING IN

ACUTE SYMPTOMS: DIZZINESS, HEADACHE, VOMITING, NAUSEA,DIARRHEA, LIQUID IRRITATES EYES, DRIES SKIN

CHRONIC SYMPTOMS: KIDNEY AND/OR LIVER DAMAGE IF INGESTED, INHALATION MAY CAUSE ANEMIA, BONE MARROW HYPOPLASIA, DERMATITIS WITH SKIN CONTACT

FIRST AID

INHALATION: REMOVE TO FRESH AIR, GIVE ARTIFICAL RESPIRATION IF NEEDED, SEEK MEDICAL ATTENTION

EYE CONTACT: FLUSH/RINSE WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES
CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH THIS CHEMICAL

SKIN CONTACT: REMOVE CONTAMINATED CLOTHING; WASH WITH SOAP AND WATER

INGESTION: DO NOT INDUCE VOMITING; SEEK MEDICAL ATTENTION IMMEDIATELY

DISPOSAL/WASTE TREATMENT:

CO,CO2

REFERENCES CONSULTED: [ ] VERSCHUERAN [ ] MERCK INDEX [X] HAZARDLINE [X] ACGIH [ ] TOXIC & HAZARDOUS SAFETY MANUAL [X] CHRIS [X] SAX
[X] NIOSH/OSHA POCKET GUIDE
[ ] OTHER: ALDRICH, SITTIG

CHEMICAL NAME: TRICHLOROETHYLENE

CAS NUMBER: 79-01-6 DOT NAME/ID NO.: RQ:
SYNONYMS: TCE, TRICHLOROETHENE, ETHYLENE TRICHLORIDE

CHEMICAL AND PHYSICAL PROPERTIES:

CHEMICAL FORMULA: C2HCL3 MOLECULAR WEIGHT: 131 PHYSICAL STATE: LIQUID SPG/D 146 SOLUBILITY (H20): INSOLUBLE
VAPOR PRESS: 58 MM FREEZING POINT: -123 F BOILING POINT: 188 F FLASH POINT: NONE FLAMMABLE LIMITS: 8-10.5%
ODOR CHARACTERISTICS:
INCOMPATABILIITIES: STRONG CAUSTICS, CHEMICALLY ACTIVEMETALS

BIOLOGICAL PROPERTIES:

IDLH: TLV-TWA: 50 PPM PEL: 100 PPM ODOR THRESHOLD: 50 PPM
HUMAN (LCLO): 160 PPM/83MIN RAT/MOUSE (LC50): 8000 PPM AQUATIC: 100-10 PPM
CARCINOGEN: POS ANIM TERATOGEN: MUTIGEN: EXPER
ROUTE OF EXPOSURE: [X] INHALATION [X] EYE CONTACT [X] SKIN CONTACT [X] INGESTION

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

500 PPM APR W/ORGANIC CARTRIDGE; 1000 PPM-SCBA, EXCEL-VITON; GOOD-NEOPRENE/STYRENE; POOR-BUTYL, NEOPRENE, NITRILE

MONITORING RECOMMENDATIONS:

HEALTH HAZARDS:

ACUTE SYMPTOMS: IRRITATION OF NOSE & THROAT, NAUSEA, BLURRED VISION, IRRITATION TO EYES, DERMATITIS

CHRONIC SYMPTOMS: LIVER AND/OR KIDNEY DAMAGE, CARDIAC DEGENERATION, CENTRAL NERVOUS SYSTEM DEGENERATION

FIRST AID

INHALATION: REMOVE TO FRESH AIR, GIVE ARTIFICAL RESPIRATION IF NEEDED, SEEK MEDICAL ATTENTION

EYE CONTACT: FLUSH/RINSE WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES

SKIN CONTACT: REMOVE CONTAMINATED CLOTHING; WASH WITH SOAP AND WATER

INGESTION: GIVE LARGE QUANTITIES OF WATER; INDUCE VOMITING; SEEK MEDICAL ATTENTION

DISPOSAL/WASTE TREATMENT:

REFERENCES CONSULTED: [ ] VERSCHUERAN [ ] MERCK INDEX [ ] HAZARDLINE [X] ACGIH [ ] TOXIC & HAZARDOUS SAFETY MANUAL [X] CHRIS [X] SAX
[X] NIOSH/OSHA POCKET GUIDE
[ ] OTHER: ALDRICH, RTECS, SITTIG

CHEMICAL NAME: DDD

CAS NUMBER: 72-54-8 DOT NAME/ID NO.: RQ:
SYNONYMS: 1,1 Dichloro 2,2 bis(p chlorophenyl) ethane

CHEMICAL AND PHYSICAL PROPERTIES:

CHEMICAL FORMULA: (4-ClC6H4)2CH-CHC MOLECULAR WEIGHT: 320 PHYSICAL STATE: solid SPG/D 1.47 SOLUBILITY (H20): No data
VAPOR PRESS: NA FREEZING POINT: 234 F BOILING POINT: Not pert. FLASH POINT: FLAMMABLE LIMITS:
ODOR CHARACTERISTICS: Not available
INCOMPATABILIITIES: None

BIOLOGICAL PROPERTIES:

IDLH: TLV-TWA: 1MG/M3 PEL: 1MG/M3 ODOR THRESHOLD: na
HUMAN (LCLO): RAT/MOUSE (LC50): 3.4G/kG- AQUATIC:
CARCINOGEN: TERATOGEN: MUTIGEN:
ROUTE OF EXPOSURE: [X] INHALATION [X] EYE CONTACT [X] SKIN CONTACT [X] INGESTION

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

Respiratory protection with GMC-H cartridges, skin protection (gloves and coveralls)

MONITORING RECOMMENDATIONS:

Particulates in air - miniram

HEALTH HAZARDS:

ACUTE SYMPTOMS: vomiting, eye irritation

CHRONIC SYMPTOMS: delayed symptoms similar to those caused by DDT

FIRST AID

INHALATION: REMOVE TO FRESH AIR, GIVE ARTIFICAL RESPIRATION IF NEEDED, SEEK MEDICAL ATTENTION

EYE CONTACT: FLUSH/RINSE WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES

SKIN CONTACT: REMOVE CONTAMINATED CLOTHING; WASH WITH SOAP AND WATER

INGESTION: SEEK MEDICAL ATTENTION AS SOON AS POSSIBLE

DISPOSAL/WASTE TREATMENT:

Segregate contaminated material, double bag, dispose of as hazardous material

REFERENCES CONSULTED: [ ] VERSCHUERAN [ ] MERCK INDEX [ ] HAZARDLINE [X] ACGIH [ ] TOXIC & HAZARDOUS SAFETY MANUAL [X] CHRIS [ ] SAX
[X] NIOSH/OSHA POCKET GUIDE
[ ] OTHER: Pattys Industrial Hygiene and Toxicology

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JOB NO: ZT2051 HAZARD EVALUATION OF CHEMICALS PREPARATION/UPDATE DATE 5-22-90

CHEMICAL NAME: DDT

CAS NUMBER: 50-29-3 DOT NAME/ID NO.: RQ:

SYNONYMS: CITOX, GENITOX, DICHLORODIPHENYLTRICHLOROETHANE

CHEMICAL AND PHYSICAL PROPERTIES:

CHEMICAL FORMULA: C14H9C15 MOLECULAR WEIGHT: 355 PHYSICAL STATE: SOLID SPG/D 156 C SOLUBILITY (H20): INSOLUBLE

VAPOR PRESS: 1.7 FREEZING POINT: 228 F BOILING POINT: DECOMP FLASH POINT: NOT COMB FLAMMABLE LIMITS: NOT COMB

ODOR CHARACTERISTICS:

INCOMPATABILIITIES: STRONG OXIDIZERS

BIOLOGICAL PROPERTIES:

IDLH: TLV-TWA: 1 MG/M3 PEL: 1 MG/M3 ODOR THRESHOLD: NONE

HUMAN (LCLO): RAT/MOUSE (LC50): AQUATIC: UNDER 1 PPM

CARCINOGEN: SUS-ANIM TERATOGEN: MUTIGEN:

ROUTE OF EXPOSURE: [X] INHALATION [X] EYE CONTACT [X] SKIN CONTACT [X] INGESTION

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

RESPIRATORS:ANY DETECTABLE LIMIT - SCBA, PROTECTIVE CLOTHING:WEAR IMPERVIOUS CLOTHING, SPECIAL EQUIPMENT:PREVENT REPEATED PROLONGED CONTACT

MONITORING RECOMMENDATIONS:

HEALTH HAZARDS: EXPOSURE MAY CAUSE A PRICKLING SENSATION OF THE TONGUE, LIPS AND FACE. IT MAY ALSO CAUSE HEADACHE, FATIGUE, VOMITING, DIZZINESS, TREMORS, CONVULSIONS, PARTIAL PARALYSIS OF HANDS AND COMA. IT CAN ALSO CAUSE IRRITATION OF EYES AND SKIN.

ACUTE SYMPTOMS: IRRITATION TO EYES & SKIN, HEADACH, CONFUSION, CONVULSIONS, DIZZINESS, TREMORS, VOMITING, PARALYSIS OF TONGUE, LIPS, FACE

CHRONIC SYMPTOMS: LIVER AND/OR KIDNEY DAMAGE, LIVER CANCER ON LAB ANIMALS, CENTRAL NERVOUS SYSTEM DEFECTS, PARALYSIS OF HANDS

FIRST AID

INHALATION: REMOVE TO FRESH AIR, GIVE AMYL NITRITE PEARLS; GIVE ARTIFICAL RESPIRATION IF NEEDED, SEEK MEDICAL ATTENTION

EYE CONTACT: FLUSH/RINSE WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES
CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH DDT

SKIN CONTACT: REMOVE CONTAMINATED CLOTHING; WASH WITH SOAP AND WATER

INGESTION: MEDICAL ATTENTION IMMEDIATELY FOR GASTRIC LAVAGE & ANTEDOTES

DISPOSAL/WASTE TREATMENT:

REFERENCES CONSULTED: [ ] VERSCHUERAN [ ] MERCK INDEX [ ] HAZARDLINE [X] ACGIH [ ] TOXIC & HAZARDOUS SAFETY MANUAL [X] CHRIS [X] SAX
[X] NIOSH/OSHA POCKET GUIDE
[ ] OTHER: RTECS

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JOB NO: ZT2051 HAZARD EVALUATION OF CHEMICALS PREPARATION/UPDATE DATE 5-24-90

CHEMICAL NAME: TETRACHLOROETHYLENE

CAS NUMBER: 127-18-4 DOT NAME/ID NO.: RQ:

SYNONYMS: PERCHLOROETHYLENE, 1,1,2,2-TETRACHLOROETHYLENE

CHEMICAL AND PHYSICAL PROPERTIES:

CHEMICAL FORMULA: CCL2CCL2 MOLECULAR WEIGHT: 166 PHYSICAL STATE: LIQUID SPG/D 1.63 SOLUBILITY (H20): INSOLUBLE

VAPOR PRESS: 14 MM FREEZING POINT: -8 F BOILING POINT: 250 F FLASH POINT: NOT FLAMM FLAMMABLE LIMITS: NOT FLAM

ODOR CHARACTERISTICS:

INCOMPATABILIITIES: STRONG OXIDIZERS BASES, CHEM ACTIVE METALS

BIOLOGICAL PROPERTIES:

IDLH: TLV-TWA: 50 PPM PEL: 100 PPM ODOR THRESHOLD: 5 PPM

HUMAN (LCLO): 96 PPM/7H RAT/MOUSE (LC50): 4000 PPM AQUATIC: 100-10 PPM

CARCINOGEN: POS ANIM TERATOGEN: MUTIGEN: EXPER

ROUTE OF EXPOSURE: [X] INHALATION [X] EYE CONTACT [X] SKIN CONTACT [X] INGESTION

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

500 PPM USE SCBA, EXCEL-VITON; GOOD-VINYL, NITRILE, POOR-BUTYL, NEOPRENE, PREVENT PROLONGED CONTACT WITH SKIN

MONITORING RECOMMENDATIONS:

HEALTH HAZARDS:

ACUTE SYMPTOMS: BURNING & IRRITATION OF EYES, NOSE, THROAT, VOMITING, NAUSEA, DIZZINESS, HEADACHE

CHRONIC SYMPTOMS: DAMAGE TO KIDNEY AND/OR LIVER ALCOHOL MAY INCREASE TOXIC EFFECTS

FIRST AID

INHALATION: REMOVE TO FRESH AIR, GIVE ARTIFICAL RESPIRATION IF NEEDED, SEEK MEDICAL ATTENTION

EYE CONTACT: FLUSH/RINSE WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES

SKIN CONTACT: REMOVE CONTAMINATED CLOTHING; WASH WITH SOAP AND WATER

INGESTION: GIVE LARGE QUANTITIES OF SALT WATER; INDUCE VOMITING; SEEK MEDICAL ATTENTION

DISPOSAL/WASTE TREATMENT:

REFERENCES CONSULTED: [ ] VERSCHUERAN [ ] MERCK INDEX [X] HAZARDLINE [X] ACGIH [ ] TOXIC & HAZARDOUS SAFETY MANUAL [X] CHRIS [X] SAX
[X] NIOSH/OSHA POCKET GUIDE
[ ] OTHER: SITTIG

ecology and environment. inc.

JOB NO: ZT2051 HAZARD EVALUATION OF CHEMICALS PREPARATION/UPDATE DATE 5-22-90

CHEMICAL NAME: 1,1-DICHLOROETHYLENE

CAS NUMBER: 75-35-4 DOT NAME/ID NO.: RQ:

SYNONYMS: VINYLIDENE CHLORIDE, DCE, VC

CHEMICAL AND PHYSICAL PROPERTIES:

CHEMICAL FORMULA: CH2CCL2 MOLECULAR WEIGHT: 97 PHYSICAL STATE: LIQUID SPG/D 1.21 SOLUBILITY (H20):

VAPOR PRESS: 3.3 MM FREEZING POINT: -188 F BOILING POINT: 89 F FLASH POINT: 0 F FLAMMABLE LIMITS: 7-3-16%

ODOR CHARACTERISTICS:

INCOMPATABILIITIES: OXIDIZERS, NITRIC ACID, CAN EXPLODE SPONTANEOUSLY

BIOLOGICAL PROPERTIES:

IDLH: TLV-TWA: 5 PPM PEL: 1 PPM ODOR THRESHOLD: NOT AVAIL

HUMAN (LCLO): RAT/MOUSE (LC50): AQUATIC:

CARCINOGEN: EXPER TERATOGEN: MUTIGEN: EXPER

ROUTE OF EXPOSURE: [X] INHALATION [X] EYE CONTACT [X] SKIN CONTACT [X] INGESTION

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

FULL FACE APR IN AREAS OF HIGH CONCENTRATION, USE GLOVES & IMPERVIOUS CLOTHING TO AVOID CONTACT

MONITORING RECOMMENDATIONS:

HEALTH HAZARDS: SUSPECTED CARCINOGEN. POISON BY INHALATION, INGESTION AND INTRAVENOUS ROUTES. A VERY DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

ACUTE SYMPTOMS: VAPOR CAN CAUSE DIZZINESS, DRUNKENESS HIGH LEVELS MAY CAUSE ANESTHESIA. LIQUID IRRITATES SKIN & EYES.

CHRONIC SYMPTOMS: VARIABLE DATA IN CARCINOGENICITY TESTS, LAB ANIMALS DEVELOPED LIVER AND/OR KIDNEY CANCER

FIRST AID

INHALATION: REMOVE TO FRESH AIR, GIVE AMYL NITRITE PEARLS; GIVE ARTIFICAL RESPIRATION IF NEEDED, SEEK MEDICAL ATTENTION

EYE CONTACT: FLUSH/RINSE WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES

SKIN CONTACT: REMOVE CONTAMINATED CLOTHING; WASH WITH SOAP AND WATER

INGESTION: DO NOT INDUCE VOMITING; SEEK MEDICAL ATTENTION IMMEDIATELY

DISPOSAL/WASTE TREATMENT:

REFERENCES CONSULTED: [ ] VERSCHUERAN [ ] MERCK INDEX [ ] HAZARDLINE [X] ACGIH [ ] TOXIC & HAZARDOUS SAFETY MANUAL [X] CHRIS [X] SAX

[ ] NIOSH/OSHA POCKET GUIDE

[ ] OTHER:

ATTACHMENT 2
STANDARD OPERATING PROCEDURES FOR PREVENTION OF HEAT/COLD STRESS

HEAT STRESS PREVENTION AND TREATMENT

Elevated temperatures are potentially hazardous, especially when work is conducted without appropriate precautions. The following sections describe heat stress prevention and the recognition and treatment of heat emergencies.

Effects of Heat

A predictable amount of heat is generated as a result of normal oxidation processes within the body. If heat is liberated rapidly, the body cools to a point at which the production of heat is accelerated, and the excess heat brings the body temperature back to normal.

Interference with the elimination of heat leads to its accumulation and to the elevation of body temperature. This condition produces a vicious cycle in which certain body processes accelerate and generate additional heat. Afterward, the body must eliminate not only the heat that is normally generated but also the additional quantities of heat.

Most body heat is brought to the surface by the bloodstream and escapes to cooler surroundings by conduction and radiation. If moving air or a breeze strikes the body, additional heat is lost by convection. When the temperature of the surrounding air becomes equal to or rises above the body temperature, all the heat must be lost by vaporization of the moisture or sweat from skin surfaces. As the air becomes more humid (contains more moisture), vaporization from the skin decreases. Weather conditions including high temperatures (90 to 100 degrees F), high humidity, and little or no breeze cause the retention of body heat. Such conditions or a succession of such days (a heat wave) increase the chances of a medical emergency due to heat.

Preventing Emergencies Due to Heat

When working in situations where the ambient temperatures and humidity are high, and especially in situations where protection levels A, B, or C are required, the site safety officer should:

- Ensure that all employees drink plenty of fluids (Gatorade or its equivalent);
- Ensure that frequent breaks are scheduled so overheating does not occur; and
- Revise work schedules, when necessary, to take advantage of the cooler parts of the day (i.e., 5:00 a.m. to 11:00 a.m. and 6:00 p.m. to nightfall).

When protective clothing is required, the suggested guidelines correlating ambient temperature and maximum wearing time per excursion are:

Ambient Temperature	Maximum Wearing Time per Excursion
Above 90 degrees F	15 minutes
85 to 90 degrees F	30 minutes
80 to 85 degrees F	60 minutes
70 to 80 degrees F	90 minutes

60 to 70 degrees F	120 minutes
50 to 60 degrees F	180 minutes

One method of measuring the effectiveness of an employee's rest-recovery regime is by monitoring the heart rate. The "Brouha guideline" is one such method and is performed as follows:

- Count the pulse rate for the last 30 seconds of the first minute of a 3-minute period, the last 30 seconds of the second minute, and the last 30 seconds of the third minute; and
- Double each result to yield beats per minute.

If the recovery pulse rate during the last 30 seconds of the first minute is 110 beats/minute or less, and the deceleration between the first, second, and third minutes is at least 10 beats/minute, then the work-recovery regime is acceptable. If the employee's rate is above the rate specified, a longer rest period will be required, accompanied by an increased intake of fluids.

Heat Emergencies

Heat Cramps. Heat cramps usually affect people who work in hot environments and perspire a great deal. Loss of salt from the body causes very painful cramps in leg and abdominal muscles. Heat cramps may also result from drinking iced water or other drinks either too quickly or in too large a quantity. The symptoms of heat cramps are:

- Painful muscle cramps in legs and abdomen;
- Faintness; and
- Profuse perspiration.

To provide emergency care for heat cramps, move the patient to a cool place. Give him or her sips of liquids such as Gatorade or its equivalent. Apply manual pressure to the cramped muscle. Move the patient to a hospital if there is any indication of a more serious problem.

Heat Exhaustion. Heat exhaustion also may occur in individuals working in hot environments and may be associated with heat cramps. Heat exhaustion is caused by the pooling of blood in the vessels of the skin. The heat is transported from the interior of the body to the surface by the blood. The skin vessels become dilated and a large amount of blood is pooled in the skin. This condition, plus the blood that is pooled in the lower extremities when in an upright position, may lead to an inadequate return of blood to the heart and eventual physical collapse. The symptoms of heat exhaustion are:

- Weak pulse;
- Rapid and usually shallow breathing;
- Generalized weakness;
- Pale, clammy skin;

- Profuse perspiration;
- Dizziness/faintness; and
- Unconsciousness.

To provide emergency care for heat exhaustion, move the patient to a cool place and remove as much clothing as possible. Have the patient drink cool water, Gatorade, or its equivalent. If possible, fan the patient continually to remove heat by convection, but do not allow chilling or overcooling. Treat the patient for shock and move him or her to a medical facility if there is any indication of a more serious problem.

Heat Stroke. Heat stroke is a profound disturbance of the heat-regulating mechanism and is associated with high fever and collapse. It is a serious threat to life and carries a 20% mortality rate. Sometimes this condition results in convulsions, unconsciousness, and even death. Direct exposure to sun, poor air circulation, poor physical condition, and advanced age (over 40) increase the chance of heat stroke. Alcoholics are extremely susceptible. The symptoms of heat stroke are:

- Sudden onset;
- Dry, hot, and flushed skin;
- Dilated pupils;
- Early loss of consciousness;
- Full and fast pulse;
- Deep breathing at first, followed by shallow or faint breathing;
- Muscle twitching, growing into convulsions; and
- Body temperature reaching 105 to 106 degrees F or higher.

When providing emergency care for heat stroke, remember that it is a life-threatening emergency. Transportation to a medical facility should not be delayed. Move the patient to a cool environment, if possible, and remove as much clothing as possible. Ensure an open airway. Reduce body temperature promptly by dousing the body with water or, preferably, by wrapping the patient in a wet sheet. If cold packs are available, place them under the arms, around the neck, at the ankles, or any place where blood vessels that lie close to the skin can be cooled. Protect the patient from injury during convulsions.

DAILY SAFETY MEETING RECORD

INITIAL PROJECT SAFETY CHECKLIST

1. Emergency information reviewed? ____ and made familiar to all team members? _____
2. Route to nearest hospital driven? ____ and its location known to all team members? ____
3. Health and safety plan readily available and its location known to all team members? ____
4. E & E Drilling SOP on site? ____ and available for team member review? ____

ATTENDEES

Meeting shall be attended by all personnel who will be working within the exclusion area. Daily informal update meetings will be held prior to work and when site tasks and/or conditions change.

Name (Printed)	Name (Signature)	Date	Representing (Company/Agency)
Meeting Conducted By:			